

## CLAIMS

What is claimed is:

1. An improved wall construction, comprising:

a compressed straw panel, said panel being comprised of compressed straw  
5 or other cellulosic fibers and having a substantially rectangular shape and having a  
first and second side;

a plurality of resilient rail members, said rail members each having a  
substantially elongated shape and a first and second edge, said first and second  
edge suitable for flat contact with a planar surface;

10 first fastener means suitable for attaching said first edge rail members to  
said first side straw panel;

a first gypsum board sheet, said first gypsum board sheet having a  
substantially rectangular shape, an inside and outside face, and being oriented  
adjacent and planar to said first side of straw panel so to create a uniform first air  
15 space therebetween;

first penetrating fastener means suitable for attaching said first gypsum  
board sheet to said second side of rail members;

a plurality of resilient z-channel members, said z-channel members each  
having a substantially elongated shape and a substantially "Z" shaped cross  
20 section and having a first and second flange, said first and second flange being  
coplanar;

second fastener means suitable for attaching said first flange of z-channel members to said second side of straw panel;

a second gypsum board sheet, said second gypsum board sheet having a substantially rectangular shape, an inside and outside face, and being oriented  
5 adjacent and planar to said second side of straw panel and spaced so as to create a uniform second air space therebetween;

second penetrating fastener means suitable for attaching said second gypsum board sheet to said second flange of z-channel members; and

insulating material, said insulating material positioned between said second  
10 side of straw panel and said inside face of second gypsum board sheet, said insulating material further sized to substantially and uniformly cover said second side of straw panel and partially fill said second air space.

2. The improved wall construction of claim 1, wherein said z-channel members each  
15 comprise:

a web member, said web member being substantially flat and having a first and second edge;

a first flange member, said first flange member being substantially flat and having an inside and outside edge, said inside edge being rigidly connected to said  
20 first edge of said web member, said first flange member being oriented with respect to said web member as to provide an angle therebetween greater than 95°;

a second flange member, said second flange member being substantially flat and having an inside and outside edge, said inside edge being rigidly connected to said second edge of said web member, said second flange member oriented with respect to said web member as to provide an angle therebetween greater than 95°, said second flange further oriented to be coplanar with said first flange member.

3. The improved wall construction of claim 2, wherein said z-channel members are made of a material having a melting temperature above 2400 °F and Young's modulus below  $30 \times 10^6$  lbs./in<sup>2</sup>.
4. The improved wall construction of claim 3, wherein said z-channel members are made of material selected from the group of steel, iron containing alloys, aluminum containing alloys, copper containing alloys, thermoplastic polymers, and thermosetting polymers.
5. The improved wall construction of claim 1, wherein said first air space between said first side of compressed straw panel and said inside face of first gypsum board sheet is at least ½" wide.

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6. The improved wall construction of claim 1, wherein said second air space between said second side of compressed straw panel and said inside face of second gypsum board sheet is at least 1-½" wide.

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7. The improved wall construction of claim 1, wherein said insulating material fills not more than 75% of the volume of said second air space.

8. The improved wall construction of claim 1, wherein said insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness not more than 75% of the distance of a line normal to said second side of compressed straw panel and said inside face of second gypsum board sheet.

- 15 9. The improved wall construction of claim 1, wherein said insulating material fills 100% of the volume of said second air space.

10. The improved wall construction of claim 1, wherein said insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness equal to the distance of a line  
5 normal to said second side of compressed straw panel and said inside face of second gypsum board sheet.
11. The improved wall construction of claim 1, wherein said first and second fastener means comprise nails, brads, tacks, staples, screws, lag screws, rivets, bolts, lag  
10 bolts, machine bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any combination thereof.
12. The improved wall construction of claim 1, wherein said first and second penetrating fastener means comprise nails, brads, tacks, staples, screws, lag screws,  
15 rivets, bolts, lag bolts, machine bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any combination thereof.

13. An improved wall construction, comprising:

a compressed straw panel, said panel being comprised of compressed straw or other cellulosic fibers and having a substantially rectangular shape and having a first and second side;

a plurality of resilient first z-channel members, said first z-channel members each having a substantially elongated shape and a substantially "Z" shaped cross section and having a first and second flange, said first and second flange being coplanar therebetween;

first fastener means suitable for attaching said first flange of said first z-channel members to said first side straw panel;

a first gypsum board sheet, said first gypsum board sheet having a substantially rectangular shape, an inside and outside face, and being oriented adjacent and planar to said first side of straw panel so to create a uniform first air space therebetween;

first penetrating fastener means suitable for attaching said first gypsum board sheet to said second flange of said first z-channel members;

a plurality of resilient second z-channel members, said z-channel members each having a substantially elongated shape and a substantially "Z" shaped cross section and having a first and second flange, said first and second flange being coplanar therebetween;

second fastener means suitable for attaching said first flange of second z-channel members to said second side of straw panel;

a second gypsum board sheet, said second gypsum board sheet having a substantially rectangular shape, an inside and outside face, and being oriented adjacent and planar to said second side of straw panel and spaced so as to create a uniform second air space therebetween;

second penetrating fastener means suitable for attaching said second gypsum board sheet to said second flange of second z-channel members;

first insulating material, said first insulating material positioned between said first side of straw panel and said inside face of first gypsum board sheet, said insulating material further sized to substantially and uniformly cover said first side of straw panel and partially fill said uniform first air space; and

second insulating material, said second insulating material positioned between said second side of straw panel and said inside face of second gypsum board sheet, said insulating material further sized to substantially and uniformly cover said second side of straw panel and partially fill said uniform second air space.

14. The improved wall construction of claim 13, wherein said first and second z-channel members each comprise:

a web member, said web member being substantially flat and having a first  
5 and second edge;

a first flange member, said first flange member being substantially flat and  
having an inside and outside edge, said inside edge being rigidly connected to said  
first edge of said web member, said first flange member being oriented with  
respect to said web member as to provide an angle therebetween greater than 95°;

10 a second flange member, said second flange member being substantially  
flat and having an inside and outside edge, said inside edge being rigidly  
connected to said second edge of said web member, said second flange member  
oriented with respect to said web member as to provide an angle therebetween  
greater than 95°, said second flange further oriented to be coplanar with said first  
15 flange member.

15. The improved wall construction of claim 14, wherein said z-channel members are  
made of a material having a melting temperature above 2400 °F and Young's  
modulus below  $30 \times 10^6$  lbs./in<sup>2</sup>.

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16. The improved wall construction of claim 15, wherein said z-channel members are made of material selected from the group of steel, steel alloys, aluminum containing alloys, copper containing alloys, thermoplastic polymers, and thermosetting polymers.

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17. The improved wall construction of claim 13, wherein said first air space between said first side of compressed straw panel and said inside face of first gypsum board sheet is at least  $\frac{3}{4}$ " wide.

- 10 18. The improved wall construction of claim 13 wherein said second air space between said second side of said compressed straw panel and said inside face of second gypsum board sheet is at least  $\frac{3}{4}$ " wide.

19. The improved wall construction of claim 13 wherein said first insulating material  
15 fills not more than 75% of the volume of said first air space.

20. The improved wall construction of claim 13 wherein said second insulating material fills not more than 75% of the volume of said second air space.

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21. The improved wall construction of claim 13, wherein said first insulating material has a substantially rectangular shape, is adhered to and substantially lines said first side of compressed straw panel and has a thickness not more than 75% of the distance of a line normal to said first side compressed straw panel and said inside face of first gypsum board sheet.

22. The improved wall construction of claim 13 wherein said second insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness not more than 75% of the distance of a line normal to said second side of compressed straw panel and said inside face of second gypsum board sheet.

23. The improved wall construction of claim 13, wherein said first insulating material substantially fills 100% of the volume of said first air space.

24. The improved wall construction of claim 13, wherein said second insulating material substantially fills 100% of the volume of said second air space.

25. The improved wall construction of claim 13, wherein said first insulating material has a substantially rectangular shape, is adhered to and substantially lines said first side of compressed straw panel and has a thickness equal to the distance of a line normal to said first side compressed straw panel and said inside face of first gypsum board sheet.
26. The improved wall construction of claim 13, wherein said second insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness equal to the distance of a line normal to said second side of compressed straw panel and said inside face of second gypsum board sheet.
27. The improved wall construction of claim 13 wherein said first and second fastener means comprise nails, brads, tacks, staples, screws, lag screws, rivets, bolts, lag bolts, machine bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any combination thereof.

28. The improved wall construction of claim 13, wherein said first and second penetrating fastener means comprise nails, brads, tacks, staples, screws, lag screws, rivets, bolts, lag bolts, machine bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any combination thereof.
29. An improved wall construction, comprising:
- a compressed straw panel, said panel being comprised of compressed straw or other cellulosic fibers and having a substantially rectangular shape and having a first and second side;
  - a first gypsum board sheet, said first gypsum board sheet having a substantially rectangular shape, an inside and outside face, and being oriented adjacent and planar to said first side of straw panel;
  - first penetrating fastener means suitable for attaching said first gypsum board sheet to said first side of said compressed straw panel;
  - a plurality of resilient z-channel members, said z-channel members each having a substantially elongated shape and a substantially “Z” shaped cross section and having a first and second flange, said first and second flange being coplanar therebetween;
  - fastener means suitable for attaching said first flange of z-channel members to said second side of straw panel;

a second gypsum board sheet, said second gypsum board sheet having a substantially rectangular shape, an inside and outside face, and being oriented adjacent and planar to said second side of straw panel and spaced so as to create a uniform air space therebetween;

5                   second penetrating fastener means suitable for attaching said second gypsum board sheet to said second flange of z-channel members; and

Insulating material, said insulating material positioned between said second side of straw panel and said inside face of second gypsum board sheet, said insulating material further sized to substantially and uniformly cover said second side of straw  
10 panel and partially fill said air space.

30.   The improved wall construction of claim 29, wherein said z-channel members each comprise:

                  a web member, said web member being substantially flat and having a first  
15 and second edge;

                  a first flange member, said first flange member being substantially flat and having an inside and outside edge, said inside edge being rigidly connected to said first edge of said web member, said first flange member being oriented with respect to said web member as to provide an angle therebetween greater than 98°;

20                   a second flange member, said second flange member being substantially flat and having an inside and outside edge, said inside edge being rigidly connected to

said second edge of said web member, said second flange member oriented with respect to said web member as to provide an angle therebetween greater than 98°, said second flange further oriented to be coplanar with said first flange member.

531. The improved wall construction of claim 30, wherein said z-channel members are made of a material having a melting temperature above 2400 °F and Young's modulus below  $30 \times 10^6$  lbs./in<sup>2</sup>.

32. The improved wall construction of claim 31, wherein said z-channel members are made of material selected from the group of steel, iron containing alloys, aluminum containing alloys, copper containing alloys, thermoplastic polymers, and thermosetting polymers.

33. The improved wall construction of claim 29, wherein said air space between said second side of compressed straw panel and said inside face of second gypsum board sheet is at least 2" wide.

34. The improved wall construction of claim 29, wherein said insulating material fills not more than 75% of the volume of said air space.

35. The improved wall construction of claim 29, wherein said insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness not more than 75% of the distance of a line normal to said second side of compressed straw panel and said inside face of  
5 second gypsum board sheet.

36. The improved wall construction of claim 29, wherein said insulating material fills 100% of the volume of said air space.

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37. The improved wall construction of claim 29, wherein said insulating material has a substantially rectangular shape, is adhered to and substantially lines said second side of compressed straw panel and has a thickness equal to the distance of a line normal to said second side of compressed straw panel and said inside face of second gypsum  
15 board sheet.

38. The improved wall construction of claim 29, wherein said fastener means comprise:  
nails, brads, tacks, staples, screws, lag screws, rivets, bolts, lag bolts, machine  
bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any  
20 combination thereof.

39. The improved wall construction of claim 29, wherein said first and second penetrating fastener means comprise nails, brads, tacks, staples, screws, lag screws, rivets, bolts, lag bolts, machine bolts, carriage bolts, stove bolts, toggle bolts, anchor bolts, adhesives, or any combination thereof.